

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E –Ist SEMESTER–EXAMINATION – JULY- 2012****Subject code: 711806N****Date: 11/07/2012****Subject Name: Water and Wastewater Treatment Technologies****Time: 2:30 pm – 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) With the help of a neat sketch explain the conventional domestic wastewater treatment plant along with important design parameters. **07**
- (b) Give the difference between : **07**
- (i) Zone settling and compression settling
 - (ii) Scour velocity and settling velocity

- Q.2** (a) Draw a neat sketch of a Rapid Sand Filter and explain in detail its component parts. **07**
- (b) Prepare a list of chemical coagulant used in water and wastewater treatment. **07**
With the help of chemical reactions explain the coagulation with alum.

OR

- (b) Explain the concept of biological treatment along with the objectives and classification of biological treatment processes. **07**

- Q.3** (a) Explain in brief the importance of following parameters, along with their sources, in water and wastewater : **08**
- (i) Total Dissolved solids.
 - (ii) Nitrates
 - (iii) Alkalinity
 - (iv) Sulphates
- (b) Write the mass balance for CFSTR with recycle and hence derive the equation for the volume of Activated Sludge Process. **06**

OR

- Q.3** (a) Define and explain the following terms: **04**
- (i) Specific growth rate
 - (ii) Food to microbe ratio.
 - (iii) Maximum specific growth rate.
 - (iv) Substrate utilization rate
- (b) The kinetic parameters are determined using a bench scale activated sludge reactor with out recycle. The results are shown below. Determine the parameters **10**

Run	So mg/L BOD ₅	Se mg/L BOD ₅	Θ days	X mg VSS/L
1	300	7	3.1	127
2	300	12	2.1	126
3	300	19	1.7	135
4	300	31	1.2	130

- Q.4** (a) Write a short note on “Tube Settler” **07**

- (b) Assuming the diameter of the clarifier to be 20 m and an average wastewater flow rate of 40 MLD, calculate the detention time and surface overflow rate of a clarifier having a wastewater depth of 2.5 m in the clarifier. **07**

OR

- Q.4** (a) Explain the functional zones of sedimentation tank **07**
(b) A treatment unit is 1.5m wide, 20 m long and has a wastewater depth of 2.0 m. If the wastewater flow through the tank is $30 \text{ m}^3 / \text{min}$, calculate the detention time. **07**

- Q.5** (a) Write the applications of screens in wastewater treatment plant. **07**
(b) Explain BOD progression curve in detail. **07**

OR

- Q.5** (a) Give the classification of grit chamber and explain any one in detail. **07**
(b) Explain the phenomenon of sloughing in Trickling Filter **07**
